

# General Botany



**What is it?** The Scientific Study of Plants!

**Who is teaching it?** Mr. Mark Lee, Instructor

**When is it?** Section 003: Tuesday/Thursday, 1:00PM – 3:45PM  
Office Hours: Monday-Thursday, 3:45PM – 5:00PM  
Friday, 9:30AM – 12:15PM

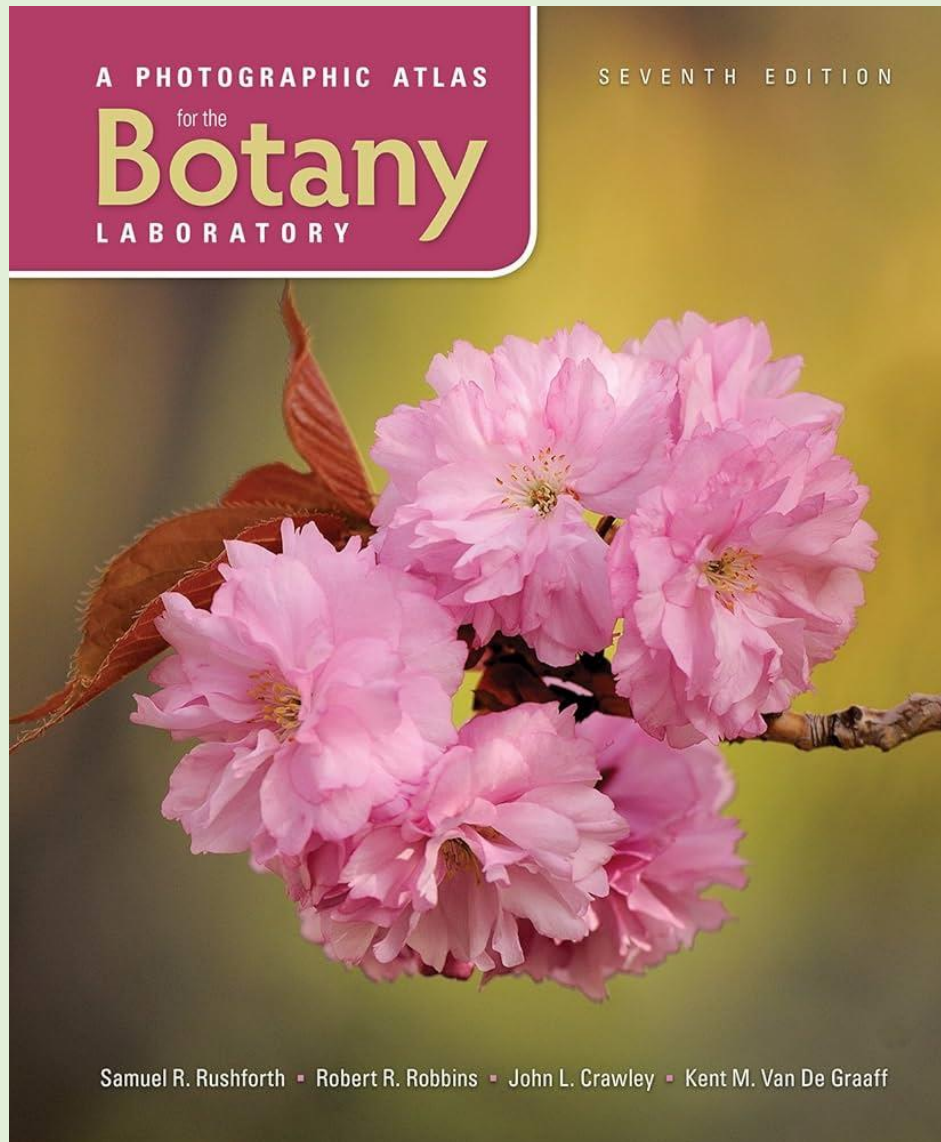
**Where is it?** Section 003: Science Room 188 (Lecture), Science Room 128 (Lab)

Office Hours: Science Room 79

**How will I be graded?**

Four Exams (11 points each); Ten Quizzes (1 point each);  
Ten Discussions (0.5 points each); Ten Assignments (1 point each);  
Three Practicals (7 points each); One Final Presentation (10 points)

**What do I need?**



**Photographic Atlas for the Botany Laboratory (7<sup>th</sup> Edition)**

## Schedule

The schedule below is tentative and subject to change. A detailed, up-to-date schedule will be available on Blackboard. The instructor will strive to let students know of any significant changes ahead of time via Blackboard. It is the student's responsibility to keep up to date on any such changes.

### UNIT I

Week 1 – August 26 – Introduction to Life Sciences; Scientific Literacy; Fundamental Chemistry; Organic Molecules; Study Techniques, **Assignment: Scientific Method; Discussion: Pseudoscience**

Week 2 – September 2 – Cell Structure; Osmosis; Microscope Use; **Assignment: Biological Root Words; Quiz 1; LABOR DAY**

Week 3 – September 9 – Cell Division; Chromosomes; Protein Synthesis; Cellular Respiration; Photosynthesis; **Discussion: Polyploidy; Quiz 2**

Week 4 – September 16 – **FIRST EXAM**

### UNIT II

Week 4 (continued) – September 16 - Campus Nature Walk; Genetics; Punnett Squares; **Discussion: Non-Mendelian Inheritance; Assignment: Nature Walk Observations**

Week 5 – September 23 – Evolution; Evolutionary Mechanisms; Plant Tissues; Tissue Survey; **Assignment: Paleontology; Quiz 3**

Week 6 – September 30 – Roots & Soils; Root Survey; Stems; Stem Survey; **Discussion: Function of Roots; Quiz 4**

Week 7 – October 7 – Movement & Support; Human Body; Classification & Phylogeny; Phylogenetic Activity; **Assignment: Vegetative Structures Review; Discussion: Function of Leaves; Quiz 5**

Week 8 – October 14 – **SECOND EXAM; FIRST PRACTICAL**

### UNIT III

Week 8 (continued) – October 14 – Breeding & Propagation; Propagation Lab;

Week 9 – October 21 – Flowers; Flower Survey; Fruits & Seeds; Fruit & Seed Survey; *Assignment: Fruit & Flower Review; Discussion: Pollination; Quiz 6*

Week 10 – October 28 – Classification & Phylogeny; Phylogenetic Exercise; Fungi; Fungi Survey; *Assignment: Speciation; Discussion: APG Classification; Quiz 7*

Week 11 – November 4 – **THIRD EXAM; SECOND PRACTICAL**

### UNIT IV

Week 11 (continued) – November 4 – Algae; Algae Survey; *Discussion: Origin of Plants*

Week 12 – November 11 – Non-vascular Plants; Non-vascular Plant Survey; Seedless Vascular Plants; Seedless Vascular Plant Survey; *Assignment: Eukaryote Classification; Quiz 8*

Week 13 – November 18 – Gymnosperms; Gymnosperm Survey; Monocots; Monocot Survey; *Discussion: Fall of the Gymnosperms; Quiz 9*

Week 14 – November 25 – Dicots; Dicot Survey; *Assignment: Plant & Algae Review; Discussion: Rise of the Angiosperms; THANKSGIVING*

Week 15 – December 2 – Ecology & Biogeography; Biomes of the World; *Assignment: Conservation; Quiz 10; FINAL PRESENTATIONS*

Week 16 – December 9 – **Finals Week; FOURTH EXAM & THIRD PRACTICAL**

**BIOL 1411: General Botany**  
**Instructor Course Information Sheet – Fall 2024**

Course Format: *Face-to-face, Levelland Campus*

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**Instructor Information**

- **Instructor:** Mark Lee, M.S.
  - **Email:** [mlee@southplainscollege.edu](mailto:mlee@southplainscollege.edu)
  - **Office Hours:**
    - Monday – Thursday: 3:45 pm – 5:00 pm
    - Friday: 9:30 am – 12:30 pm
  - **Office Location:** Science Room 79
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**Course Information**

**Course Description:**

This course covers fundamental biological concepts relevant to plant physiology, life cycle, growth and development, structure and function, and cellular and molecular metabolism. The role of plants in the environment, evolution, and phylogeny of major plant groups, algae, and fungi

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**Evaluation Criteria**

**Note:** Assignments not submitted by the deadline will receive a zero.

<b>Grading Criteria</b>	<b>Point Value</b>	<b>Total</b>
4 Exams	11	44
10 Quizzes	1	10
10 Discussions	0.5	5
10 Assignments	1	10
3 Practicals	7	21
1 Presentation	10	10
Total		100

Exams, Practicals, Quizzes and Discussions will all be done in class. Assignments will be done on Blackboard. Instructor reserves the right to change the modality of quizzes and assignments.



Every student will make a final presentation – instructions will be provided in-class and on blackboard.

## Textbooks

- **Required:**
    - *Photographic Atlas for the Botany Lab* (7th edition). ISBN: 9781617314117
  - **Recommended:**
    - *Stern's Introductory Plant Biology* (15th edition). ISBN: 9781260488623
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## Attendance

Students are expected to attend both lectures and labs. Excessive absences (>5) may result in a grade penalty. Students who expect to miss should let their instructor know as soon as possible. The instructor reserves the right to request proof of reasons for absence. Regardless of reason, students are expected to catch up on any and all material they miss. Make-up exams and assignments will be offered at the instructor's discretion and are never guaranteed.

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## Lab Safety

- **Required Attire:** Closed-toe shoes and long pants/dresses.
  - **Prohibited Items:** Food, drinks, makeup, and tobacco are not permitted in the lab. Violations will result in the student being sent away and marked absent. Excessive violations may result in a grade penalty.
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## Instructor Policies

- **Food and Drink:** Permitted in lecture unless abused, in which case the privilege will be revoked. Not permitted in lab.
- **Phones:** Permitted in lecture and lab unless abused, in which case the privilege will be revoked.
- **Exams and Quizzes:** Visibility of electronic devices or notes during exams or quizzes will result in an automatic zero, regardless of use. The instructor reserves the right to collect exams and quizzes at any time if academic dishonesty is suspected.

**For Additional Policies and Procedures, refer to the Common Course Syllabus.**

## **Student Learning Outcomes – What You Will Learn**

*For the official course learning outcomes that these SLOs were initially derived from, please refer to the common course syllabus.*

### **1. Application of Scientific Reasoning and Tools in the Laboratory:**

**Scientific Investigation:** Utilize scientific reasoning to formulate hypotheses and design experiments in the laboratory setting.

**Laboratory Techniques:** Proficiently use scientific tools such as microscopes, pipettes, and other laboratory equipment to collect and analyze data.

### **2. Critical Thinking and Problem-Solving in the Laboratory:**

**Analytical Decision-Making:** Apply critical thinking skills to evaluate data and make informed decisions during laboratory experiments.

**Problem-Solving Strategies:** Develop and implement scientific problem-solving strategies to address unexpected challenges in laboratory work.

### **3. Effective Communication of Scientific Findings:**

**Presentation of Results:** Clearly communicate the results of scientific investigations through written reports, oral presentations, and visual aids such as charts and graphs.

**Peer Communication:** Effectively communicate and collaborate with peers during group experiments and discussions, demonstrating teamwork and shared scientific inquiry.

### **4. Comparative Analysis of Plant, Algae, and Fungi Structures, Reproduction, and Characteristics:**

**Structural Comparison:** Examine and compare the anatomical and cellular structures of plants, algae, and fungi, noting both similarities and differences.

**Reproductive Mechanisms:** Analyze and contrast the reproductive strategies of plants, algae, and fungi, including both sexual and asexual reproduction.

**Ecological and Physiological Characteristics:** Investigate the physiological traits and ecological roles of plants, algae, and fungi in their respective environments.

### **5. Characteristics of Life and Essential Biological Substances:**

**Defining Life:** Describe the fundamental characteristics that define living organisms, such as growth, reproduction, and metabolism, with a focus on plants.

**Chemical Properties:** Explain the chemical properties of essential biological substances, such as water, proteins, and nucleic acids, required for life processes.

**Biological Functions:** Explore how these essential substances support key biological functions in plants, including photosynthesis and cellular respiration.

### **6. Principles of Inheritance and Genetic Problem Solving:**

**Genetic Foundations:** Understand the basic principles of inheritance, including the role of genes, alleles, and chromosomes in determining plant traits.

**Mendelian Genetics:** Apply Mendelian principles to solve genetic problems involving monohybrid and dihybrid crosses, using tools like Punnett squares.

**Genetic Variation:** Examine the sources of genetic variation in plant populations and their impact on inheritance patterns and plant diversity.

### **7. Phylogenetic Relationships and Classification in Botany:**

**Evolutionary Relationships:** Explore the evolutionary relationships among different plant groups using phylogenetic trees and molecular data.

**Classification Systems:** Understand and apply taxonomic classification systems to categorize plants based on evolutionary history and shared characteristics.

**Cladistics and Systematics:** Analyze the principles of cladistics and systematics in developing phylogenetic relationships and classification schemes for plants.

#### **8. Major Plant Phyla and Their Biological Significance:**

**Phylum Identification:** Identify and describe the major phyla of plants, including bryophytes, ferns, gymnosperms, and angiosperms, based on structural and physiological characteristics.

**Adaptation and Evolution:** Investigate the structural and physiological adaptations that have enabled plants to thrive in diverse environments.

**Ecological and Evolutionary Roles:** Examine the ecological significance and evolutionary history of each major plant phylum and their contributions to ecosystems.

#### **9. Molecular Biology of Nucleic Acids and Proteins in Plants:**

**Molecular Structures:** Describe the molecular structures of nucleic acids (DNA and RNA) and proteins in plants, focusing on their roles in genetic information and cellular functions.

**Biosynthesis Processes:** Understand the processes involved in the synthesis and regulation of nucleic acids and proteins, including transcription, translation, and replication.

**Genetic Regulation:** Explore how gene expression and regulation impact plant development, adaptation, and response to environmental stimuli.

#### **10. Photosynthesis and Respiration Pathways in Plants:**

**Photosynthetic Pathways:** Identify the substrates, products, and key processes involved in the light-dependent and light-independent reactions of photosynthesis.

**Respiratory Pathways:** Describe the chemical pathways involved in cellular respiration in plants, including glycolysis, the citric acid cycle, and oxidative phosphorylation.

**Energy Metabolism:** Analyze the regulation and efficiency of energy metabolism in plants, including the role of enzymes and environmental factors in optimizing photosynthesis and respiration.

#### **11. Unity and Diversity in the Plant Kingdom and Evolutionary Evidence:**

**Common Plant Traits:** Explain the common traits shared by plants, such as chlorophyll, cell walls, and vascular tissues, that unify the plant kingdom.

**Diversity of Adaptations:** Explore the diverse adaptations that allow plants to survive and thrive in various environments, from deserts to wetlands.

**Evolutionary Evidence:** Discuss the evidence for evolution in plants, including fossil records, comparative anatomy, and molecular biology, and how it supports the theory of natural selection.

#### **12. Sexual and Asexual Life Cycles in Plants:**

**Life Cycle Comparison:** Compare and contrast the sexual and asexual life cycles in plants, including alternation of generations and the key stages involved.

**Adaptive Significance:** Analyze the adaptive significance of different reproductive strategies, such as genetic diversity in sexual reproduction versus rapid colonization in asexual reproduction.

**Environmental Impact:** Explore how different life cycles affect plant populations and their ability to adapt to changing environmental conditions.

#### **13. Scientific Reasoning and Investigative Processes in Botany:**

**Scientific Methodology:** Apply the steps of the scientific method to botanical investigations, from hypothesis formulation to experimental design and data analysis.

**Critical Thinking:** Use critical thinking and logical reasoning to evaluate experimental results and draw evidence-based conclusions in botanical studies.

**Research Techniques:** Develop and refine research techniques in botany, including observation, data collection, and the use of scientific tools and technology.



**South Plains College**

**Common Course Syllabus: BIOL 1411**

**Revised Fall 2024**

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**Department: Biology**

**Discipline: Botany**

**Course Number: BIOL 1411**

**Course Title: General Botany**

**Available Formats: Conventional, Online**

**Campuses: Levelland, Online**

**Course Description:**

This course explores fundamental biological concepts relevant to plant physiology, life cycle, growth and development, structure and function, and cellular and molecular metabolism. The role of plants in the environment, evolution, and phylogeny of major plant groups, algae, and fungi. (ACGM 2018)

**Prerequisite:**

Must be TSI Complete in Reading prior to taking this course.

**Credit:**

4 credits - Lecture: 3 hours, Lab: 3 hours

**Textbook & Supplies:**

See the instructor course information sheet.

**Course-Specific Instructions:**

See the instructor course information sheet.

## **Core Curriculum Requirement:**

This course partially satisfies a Core Curriculum Requirement in the Life and Physical Sciences Foundational Component Area (030).

## **Core Curriculum Objectives Addressed:**

- **Communication Skills:** Effective written, oral, and visual communication.
- **Critical Thinking Skills:** Creative thinking, innovation, inquiry, and analysis, evaluation, and synthesis of information.
- **Empirical and Quantitative Competency:** Ability to manipulate and analyze numerical data or observable facts to make informed conclusions.
- **Teamwork:** Ability to consider different points of view and work effectively with others to support a shared purpose or goal.

## **Student Learning Outcomes:**

### **Lecture:**

1. Compare and contrast the structures, reproduction, and characteristics of plants, algae, and fungi.
2. Describe the characteristics of life and the basic properties of substances needed for life.
3. Identify the principles of inheritance and solve classical genetic problems.
4. Describe phylogenetic relationships and classification schemes.
5. Identify the major phyla of life with an emphasis on plants, including the basis for classification, structural and physiological adaptations, evolutionary history, and ecological significance.
6. Identify the chemical structures, synthesis, and regulation of nucleic acids and proteins.
7. Identify the substrates, products, and important chemical pathways in photosynthesis and respiration.
8. Describe the unity and diversity of plants and the evidence for evolution through natural selection.
9. Compare different sexual and asexual life cycles noting their adaptive advantages.
10. Describe the reasoning processes applied to scientific investigations and thinking.

### **Lab:**

1. Apply scientific reasoning to investigate questions and utilize scientific tools such as microscopes and laboratory equipment to collect and analyze data.
2. Use critical thinking and scientific problem solving to make informed decisions in the laboratory.
3. Communicate effectively the results of scientific investigations.
4. Compare and contrast the structures, reproduction, and characteristics of plants, algae, and fungi.
5. Describe the characteristics of life and the basic properties of substances needed for life.
6. Identify the principles of inheritance and solve classical genetic problems.

7. Describe phylogenetic relationships and classification schemes.
8. Identify the major phyla of life with an emphasis on plants, including the basis for classification, structural and physiological adaptations, evolutionary history, and ecological significance.
9. Identify the chemical structures, synthesis, and regulation of nucleic acids and proteins.
10. Identify the substrates, products, and important chemical pathways in photosynthesis and respiration.
11. Describe the unity and diversity of plants and the evidence for evolution through natural selection.
12. Compare different sexual and asexual life cycles noting their adaptive advantages.
13. Describe the reasoning processes applied to scientific investigations and thinking.

### **Course Evaluation:**

Embedded exam questions will be assessed from various sections each semester to determine student mastery of material across the course. For more information, see the instructor course information sheet.

### **Attendance Policy:**

Students are expected to attend all classes to succeed in the course. Absences that become excessive and hinder the achievement of minimum course objectives may result in the student being withdrawn from the course. Additional attendance information is provided on the instructor's course information sheet.

### **Plagiarism and Cheating:**

Students must do their work on all projects, quizzes, assignments, examinations, and papers. Violations will result in an "F" for the assignment and may lead to an "F" for the course if warranted.

#### **Plagiarism includes, but is not limited to:**

1. Turning in a paper that has been purchased, borrowed, or downloaded.
2. Cutting and pasting together information from various sources without proper documentation.
3. Using direct quotations without citation.
4. Missing in-text citations.

#### **Cheating includes, but is not limited to:**

1. Obtaining an examination by stealing or collusion.
2. Discovering the content of an examination before it is given.
3. Using unauthorized sources during an examination, quiz, or homework assignment.
4. Taking an examination for another.
5. Altering grade records.

6. Copying another's work during an examination or on a homework assignment.

### **Student Code of Conduct:**

A successful learning experience requires mutual respect. Disruptive, disrespectful, or threatening conduct will not be tolerated and may result in disciplinary action or removal from class.

### **Intellectual Exchange Statement:**

Instructors will establish and support an environment that values and nurtures individual and group differences, encouraging engagement and interaction. Respect for multiple perspectives will challenge and stimulate learning about others, the larger world, and ourselves.

### **Disabilities Statement:**

Students with disabilities who require accommodations should notify the Disability Services Office early in the semester. Proper documentation is required. Contact the Disability Services Office at Levelland, Lubbock Centers, or Plainview Center for more information.

### **Non-Discrimination Statement:**

South Plains College does not discriminate based on race, color, national origin, sex, disability, or age in its programs and activities. Inquiries should be directed to the Vice President for Student Affairs.

### **Title IX Pregnancy Accommodations Statement:**

Pregnant or recently postpartum students have the right to reasonable accommodations. To request accommodations, contact the Health and Wellness Center.

### **CARE Team:**

South Plains College is committed to the safety, health, and well-being of its students. The CARE Team assesses and responds to students who may benefit from academic, emotional, or psychological support.

### **Campus Concealed Carry Statement:**

Texas law authorizes the carrying of a concealed handgun in South Plains College buildings by those with a Texas License to Carry. Open carrying of handguns is prohibited. Violations should be reported to the College Police Department.

**Withdrawal Policy:**

The last day to withdraw/drop with a grade of “W” is December 2<sup>nd</sup>, 2024. It is the student’s responsibility to withdraw from the course if necessary. Course averages will be updated regularly, and guidance will be provided to help students make informed decisions.

**COVID-19 Guidelines:**

Students experiencing symptoms such as cough, shortness of breath, fever, or loss of taste/smell should not attend class and seek medical attention or get tested for COVID-19. SPC follows a 5-day isolation period for positive cases.

**Artificial Intelligence Statement:**

AI applications like ChatGPT are designed to supplement learning but should not replace critical thinking, creativity, and independent work. Misusing AI, including generating academic work without proper attribution, violates academic integrity policies and may result in disciplinary action.

**Note:**

The instructor reserves the right to modify the syllabus and policies and notify students of any changes during the semester.